

Options and Functions of the Revised IVS Combination Web Site

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Abstract The World Wide Web is one of the most important communication and information exchange platforms today. Because of the high amount of users and the global accessibility, every business is interested in the Internet. It opens up new possibilities of international cooperation. In geodesy, this aspect of international cooperation is of prime importance.

Keywords International Terrestrial Reference Frame 2014, IVS Combination Center, VLBI, Earth Orientation Parameter, Web site

1 Introduction

The International VLBI Service for Geodesy and Astrometry (IVS, <http://ivscc.gsfc.nasa.gov/>) is a global association of institutions for the VLBI space technique. The IVS is responsible for the determination of the Earth Orientation Parameters (EOP), as well as the contribution to the International Terrestrial Reference-frame (ITRF) based on VLBI observations. A part of the IVS, the Combination Center (CCIVS) based at the Federal Agency for Cartography and Geodesy (BKG, Germany), is the central location for consolidating analyzed VLBI data. Two combined products are generated in an operational mode: a rapid and a quarterly solution.

For the publication of these official IVS products, the CCIVS maintains a Web site, which was recently revised. The new Web site was announced via the IVS mail list in December 2015. Details of the

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combination were offered graphically and numerically at this Web presence. Due to these changes, more options and functions were added to the already available content, which will be presented in Section 3.

The Web site is available on the following link:

<http://ccivs.bkg.bund.de>

2 The Content Management System

The revision of the Web site was realized on the basis of the Content Management System (CMS) ‘GovernmentSiteBuilder’, which was developed by Materna especially for standardizations for Web sites of government departments, public authorities, and other national institutions in Germany. For this purpose, the system offers a large extent of predefined options for language settings, usability, and web accessibility. A login function, a registration mode, service functions, or graphical styles are available and can be integrated or modified for each purpose. The system bundles the information and links it together, so it simplifies the administration effort and the updates of the content. Every step of the process is recorded in layers, so that changes can be monitored individually. The content will only be published after all integrated data and links are available in the system. These security requirements will reduce potential errors.

3 New Functions

The existing content was expanded by more information and functions. Therefore the greatest importance was retaining the structure and the navigation of the initial Web site. Additional contents were added to the menu, e.g., quick links or separate menus.

graphic representation	information
+ Scale of Helmert Transformation	+ combination report
+ ITRF2014 results	+ archive
+ station coordinates	+ news and activities
+ EOP	+ calender
+ baseline	+ publication and poster
	+ observatory map
	+ service functions
	+ sitemap
	+ glossary
	+ contact form
	+ print function
	+ search function

Table 1 Added information and functions in the Web content.

3.1 ITRF2014 Results

The International Terrestrial Reference Frame (ITRF) is being processed in regular time intervals, and VLBI sessions since 1979 are taken into account. The latest version, the ITRF2014, was generated from the results of nine Analysis Centers with a total session count of 5,796 (Bachmann et al. 2016). The results of the VLBI contribution to the ITRF are presented under the menu point 'ITRF2014': station coordinates in X, Y, Z, and North, East, Up; EOP; scale of the Helmert Transformation, and baseline lengths. The data is being extracted from a database and prepared for the graphical plot tool, where each user can choose various settings. The results of the settings can be downloaded as a numerical file.

Figures 1–3 show examples from the IVS combination results for ITRF2014.

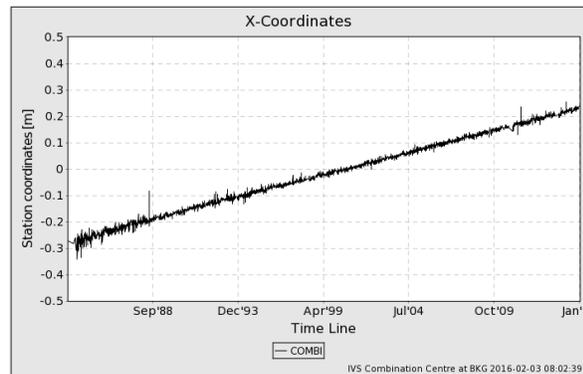


Fig. 1 X-coordinate residuals of station Wettzell from the IVS combination for ITRF2014.

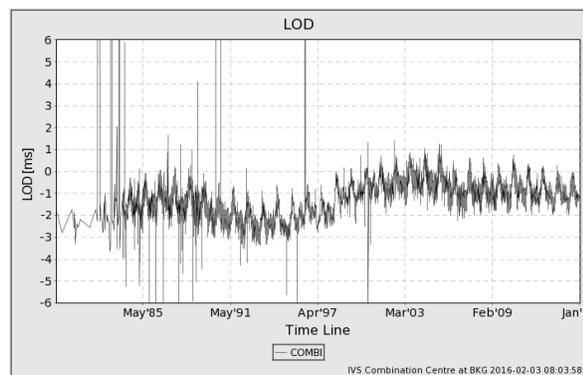


Fig. 2 Session-wise LOD estimates from the IVS combination for ITRF2014.

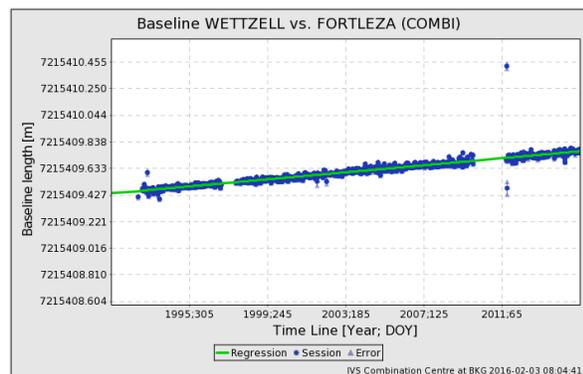


Fig. 3 Baseline length for Wettzell–Fortaleza from the IVS combination for ITRF2014.

3.2 Combination Report

The combination report for the session-wise IVS combination was established to inform all contributing ACs and all interested parties. All required information and

important details of every combination are individually assembled into a report (see Figure 4 for an example). The weight of each AC is given, and a combination statistic for each AC is calculated. The combination report contains offset, rate, and standard deviation parameters for the EOPs of each AC solution w.r.t. the combination. The estimated station coordinates and EOPs of the combination are also listed in the report. Further information can be added at any time. The SINEX file and the report can be found in the archive¹.

The reports are going to be sent out via mail as feedback to every contributing AC.

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Combination report
SOLUTION
Link to sinexfile
AC contribution
-----
AC      Session details      passed/no contribution/rejected
-----
final weighting factors in COMBI
-----
final weighting factor for AC = 1.57433639536895

COMBI ESTIMATE
-----
NUT_X ---- 13:331:23481 mas -1.48500938695768E-02  3.25226E-02
NUT_Y ---- 13:331:23481 mas  4.40258163545538E-01  3.53980E-02
UT ---- 13:331:23481 ms -5.67378509982609E+01  1.57231E-03
XPO ---- 13:331:23481 mas  5.82449514956613E+01  2.86124E-02
YPO ---- 13:331:23481 mas  2.9207023520331E+02  3.14850E-02
LOD ---- 13:331:23481 masD  1.58185802098157E+00  5.97890E-03
XPOR ---- 13:331:23481 masD -7.77877100174048E-01  1.11514E-01
YPOR ---- 13:331:23481 masD  7.68777061461013E-01  1.30853E-01
STAX 7531 13:331:25920 m  1.20246251378082E+06  3.83632E-11
STAY 7531 13:331:25920 m  2.52734526780822E+05  3.83632E-11
STAZ 7531 13:331:25920 m  6.23776622316438E+06  3.83632E-11
-----
AC
-----
+SOLUTION/STATISTICS
NUMBER OF OBSERVATIONS      1419
NUMBER OF UNKNOWN          508
WEIGHTED SQUARE SUM OF O-C  2.47538392489028D+15
SQUARE SUM OF RESIDUALS (VTPV) 9.70558975743183D+02
VARIANCE FACTOR             9.4375242222299D-01
WRMS OF POSTFIT RESIDUALS   2.27445074014065D-11
-SOLUTION/STATISTICS
-----
Parameter |value
-----|-----
sc_off_xpol | 0.001572406668811724 |
sc_s_off_xpol | 0.003209469431714736 |
sc_rat_xpol | -0.007049568244237248 |
sc_s_rat_xpol | 0.005493173993903027 |
wrms_xpol | 0.04002459446517018 |
rms_xpol | 0.06189932655994299 |
sc_off_ypol | 0.002850322490411202 |
sc_s_off_ypol | 0.004111618342854179 |
sc_rat_ypol | 0.0032113587817661 |
sc_s_rat_ypol | 0.006987686282650566 |
wrms_ypol | 0.052110586232630343 |
rms_ypol | 0.07856987726178714 |
sc_off_dut1 | 0.0001179112867964599 |
sc_s_off_dut1 | 0.0002171412514138504 |
sc_rat_dut1 | 0.0002985106989019518 |
sc_s_rat_dut1 | 0.000368560883497504 |
wrms_dut1 | 0.002895801239094685 |
rms_dut1 | 0.00316906372250698 |
    
```

Fig. 4 Structure of the combination reports.

¹ http://www.ccivs.bkg.bund.de/EN/FAQs/Archiv/archiv_node.html

3.3 Additional Functions

The new generated calendar shows the important VLBI meetings of the present year. Every month is shown separately, and the event days are affirmed clearly. Additionally, the meetings of each month are sorted alphabetically, and if a meeting is missing, it can be announced by using the contact form.

Publications of the IVS Combination Center—e.g., presentations, posters, abstracts, and proceedings—can be found under the menu ‘Publications & Poster’. Furthermore, a news page introduces and informs all users about the activities of the IVS Combination Center, and details of the latest combination are listed at this page, as well.

3.4 Service Functions

3.4.1 Contact Form

The CMS offers already a wide scope of predefined functions including the contact form. Prescribed input fields make it possible to get in contact with the IVS Combination Center easily. In this case the IVS Combination Center will receive the message with all indicated sender information. Wrong entries or incorrect information will be detected by the system automatically. For contact, please use the main e-mail address (ccivs@bkg.bund.de) of the IVS Combination Center preferably.

Fig. 5 Contact form of the ccivs Web site.

3.4.2 Sitemap, Glossary, and Search Function

The sitemap, the glossary, and the search function are also included in the system and expand the functionality of the Web site.



Fig. 6 Separated service menu of the ccivs Web site.

These three functions are introduced to simplify the navigation between all pages. The sitemap is similar to a table of content and describes the structure of the Web site. Every page can be reached by selecting the menu posts. The glossary is like a digital dictionary, which can be extended by the IVS Combination Center. It serves to describe all used abbreviations or technical terms in the page content. Colored letters symbolize valid glossary entries. Missing entries can be pointed out to the IVS Combination Center by using the contact form.

The search function is provided for browsing or searching for special words in the page content. For the search criterion, individual search terms and logical interconnections can be used. To give one example of the search criterion, you can specify the word OR between two search terms. Wildcards (*) stand for any letter and (?) for only one letter. The symbol (~) at the end of a search term provides a less precise search result.

3.4.3 Print Function

The print function can be found at each page in the footer. With this, the information of the current page (full page) can be printed out externally. The function helps to save data or the user specific settings and the results of the plot tool.

3.5 Observatory Map

The observatory map is an embedded Google Earth map for providing data of the VLBI stations. To use this map, a valid Google Earth version must be installed on

your system. Information such as station coordinates, the responsible organization, the location, and if available, a link to the observatory Web site are displayed by choosing a station symbol. The map was realized to show the VLBI network graphically (see Figure 7 for an example).



Fig. 7 VLBI network observatory map from using a Google Earth Plugin.

4 Conclusions

The reconstruction of the IVS Combination Center Web site was realized to standardize the Web presence and to make the handling more convenient. The chosen system provides these necessary conditions and serves methods and functions to implement these features additionally. By this, the content and possible settings are increased.

References

1. S. Bachmann, D. Thaller, O. Roggenbuck, M. Lösler, and L. Messerschmitt (2016) IVS contribution to ITRF2014. J Geod, doi 10.1007/s00190-016-0899-4.